

Construction safety personnel's perceptions of safety training practices



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Abstract

The effectiveness of safety training practices is an important part of safety management on a construction site. Safety professionals' perceptions of the effectiveness of training practices in safety training sessions were sought in a survey administered to the top 400 contractors in the U.S. The study shows that contractors are sensitive to organizational, feedback, content, process, and worker issues. Whenever they encounter language problems, they use visual aids, and provide translators and safety guidelines written in workers' own language. Very few statistically significant differences are observed when the findings are analyzed from the point of view of the demographic characteristics of the respondents. The contribution of this study is that it conveys the views of safety personnel about how safety learning can be achieved, sustained and improved by addressing organizational, feedback, content, process, and worker issues in training sessions. It provides project managers with best practices in safety training sessions.

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1. Introduction

Construction is considered to be a risky endeavor because of the high frequency of work-related fatalities and serious injuries. According to the Bureau of Labor Statistics (BLS) (2013a), the number of fatal work injuries in the U.S. was reported as 4628 in 2012, and 806 of these were recorded in the construction industry, while the total number of non-fatal cases was 905,690 in the same year with 71,730 of those recorded in the construction industry. Given the high proportion of fatal and non-fatal accidents occurring in the construction industry, construction companies constantly seek different and novel strategies to reduce the number of work-related accidents.

The construction safety literature shows that researchers mostly focus on safety performance on construction sites and on ways to minimize the number and severity of accidents. For example, Huang and Hinze (2003) investigated construction worker falls and found that falls represent a high proportion of construction accidents that result in fatalities. Esmail et al. (2012) developed a framework to investigate the effectiveness of fall protection systems in roofing projects. In another study conducted by Janicak (2008), the number of fatalities caused by electrocutions was found to be higher for workers in the age group 16–19, and that 125 fatalities could be prevented through effective lockout–tagout programs and verification of energy isolation. As evidenced by these few examples and many others, in general, the literature highlights the importance of the development of effective strategies in preventing work accidents in the construction industry. One such strategy that is mentioned often in the literature is formal, well organized and effective safety training. Effective safety training may lower accident rates, but there are several challenges

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associated with safety training that need to be overcome by construction companies. The extent to which workers' learning experiences are affected in safety training sessions and the extent to which workers learn safe practices in training sessions is among these challenges. Furthermore, the language barrier experienced by non-English speaking workers is a common factor that interferes with learning in safety training. However, the perceptions of safety personnel about training practices, and about the problems caused by the language barrier in safety training sessions are rarely investigated.

The objective of this study is to explore safety training practices based on the perceptions of safety personnel. This paper reports the practices of safety personnel employed by a sample of the top 400 contractors in the U.S. relative to achieving, reinforcing and improving "safety practices" in safety training sessions. Project managers who adopt effective safety training practices should be able to improve safety performance at construction sites. Additionally, the study also guides safety managers in developing sound safety plans and in better executing those plans.

2. Safety training and "learning"

Several techniques have been proposed to minimize the frequency and severity of accidents. For example, a study sponsored by the [Construction Industry Institute \(2002\)](#) identified nine areas, among which orientation and specialized training occupy a prominent position. [Hinze et al. \(2013\)](#) conducted interviews with the representatives of 57 projects in the U.S. and found that higher performance is achieved with intense safety training. [Hallowell \(2012\)](#) conducted eleven case studies in different regions of the U.S. and found that the most common methods used by companies to transfer safety knowledge are orientation and training sessions, toolbox talks, informal safety communication among workers, and formal presentations by safety managers. Overall, the current literature supports the view that training is a major factor in sustaining and improving safety performance. Learning is an important dimension of training and is discussed in the following two subsections.

2.1. Learning by native English speakers

Some examples of research work that involves "learning" in safety training include the following. [Han et al. \(2008\)](#) state that low skill levels, inadequate technical knowledge, and a steep learning curve are the factors that affect the safety performance of construction workers in a negative manner. [Porteous \(1997\)](#) states that safety knowledge, skills and abilities could be improved by well-generated learning theories. The Occupational Safety and Health Administration specifically requires that safety proficiency be evaluated and documented by the use of a written assessment and a skill demonstration to evaluate the knowledge and individual skills developed in the course of training ([OSHA, 2012](#)). [Kirkpatrick \(1998\)](#) suggests that the effectiveness of learning could be tested by observing the differences between a control group that does not receive training and a trained group. [Furnham \(2005\)](#) argues that individuals learn best when they encounter an obstacle or an

intellectual challenge that is of interest to them. According to [Furnham \(2005\)](#), the best way to help people learn is to explain the abstract of the situation and provide varied examples over an effective learning period. [Furnham \(2005\)](#) also states that people learn by modeling others' skills. In addition, [Furnham's \(2005\)](#) study also indicates that safety learning might be achieved by computer-aided tools since it has the benefit of being self-paced.

[BLR \(2007\)](#) reports that three basic learning styles exist, including visual learning, auditory learning, and hands-on learning. Workers learn things in different ways and at their own pace. For example, visual learners learn best by seeing, while auditory learners like to listen, and hands-on learners learn best through practical instruction. The [BLR \(2007\)](#) report suggests using more visual aids in safety training sessions. [Dudley \(2010\)](#) defines two teaching styles commonly used by trainers, namely andragogical and pedagogical styles. In the andragogical style, the learner is self-directed and is responsible for his/her own learning. Contrastingly, in the pedagogical style, the trainer takes the full responsibility in how the material is learned and the trainer evaluates learning. In the andragogical style, learners are internally motivated, display self-esteem, recognition, and confidence, while in the pedagogical style, learners are externally motivated by competition for performance and the negative consequences of failure.

It is to be noted that safety training is negatively affected by factors such as economic downturns, limited training budgets, and unpredictable product and technical innovations ([Furnham, 2005](#)). Additionally, the efficiency of safety training programs depends on organizational, feedback, content, process, and worker-related issues.

Organizational issues consist of the firm's structure, middle management's commitment to safety, and the effectiveness of safety trainers in improving the quality of training sessions. [Bontis et al. \(2002\)](#), [Sicilia and Lytras \(2005\)](#), and [Pham and Swierczek \(2006\)](#) assert that a supportive firm structure results in knowledge transfer and motivates workers to learn quickly and capture the necessary information in an effective manner in safety training sessions. According to [Jaselskis et al. \(1996\)](#), and [O'Toole \(2002\)](#), middle management's commitment to safety training results in experiencing lower injury rates and helps with improving a company's safety culture. Concerning the qualifications of a trainer, OSHA standards mandate that a trainer is considered to be qualified if he/she has previously completed a training program on the subject to be instructed. Furthermore, these trainers are expected to possess relevant academic credentials and teaching experience ([OSHA, 2013](#)).

Feedback issues play an important role in improved safety performance. Indeed, according to [Furnham \(2005\)](#), safety performance is enhanced by accurate and timely feedback because feedback reinforces safety learning. Also, [Loosemore \(1998\)](#) conducted research about the psychological mechanisms that cause poor safety performance in construction companies and found that feedback should be continuous to achieve actual safety performance that is aligned with planned performance. Therefore, feedback issues deserve special attention in conducting safety training.

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